NOAA's Coastal Assessment and Data Synthesis System

Fertilizer Use and Sales

Dataset Description

The Branch of Systems Analysis at the U.S. Geological Survey (USGS) provided a dataset containing county-level nitrogen and phosphorus fertilizer use for the period 1945 to 1985. The Water Resources Division at USGS provided a dataset containing county-level nitrogen and phosphorus fertilizer sales for the period 1986 to 1991.

All files obtained are geo-referenced to NOAA's Coastal Assessment Framework (CAF).
The data are available for four distinct spatial aggregations as outlined below. To view the data dictionary of each dataset, refer to NOAA's Coastal Assessment and Data Synthesis System (http://coastalgeospatial.nos.noaa.gov).

1) Coastal Watersheds (from NOAA's Coastal Assessment Framework),
2) Hydrologic Cataloging Units (8-digit sub-watersheds from the U.S. Geological Survey and a building block of NOAA's CAF),
3) Counties, and
4) States (aggregated from Counties).

Source(s) of Information

Fertilizer Use Data 1945 to 1985:
Richard B. Alexander and Richard A. Smith
Branch of Systems Analysis (BSA), USGS
410 National Center
Reston, Virginia 22092
Report: Open-File Report 90-130 (County-Level Estimates of N and P Fertilizer Use in US, 1945 to 1985)
Tel: 703-648-6869
Fax: 703-648-5295
E-mail : mailto:ralex@qvarsa.er.usgs.gov

Fertilizer Sales Data 1986 to 1991:
William A. Battaglin
Water Resources Division (WRD), USGS
P.O. Box 25046, Denver Federal Center, Bldg 25
Lakewood, CO 80225
Tel: 303-236-5939
Fax: 303-236-5959
E-mail: mailto:wbattagl@usgs.gov

Abstract

Fertilizer Use (1945 to 1985).

A database on fertilizer use was provided by the USGS Branch of Systems Analysis. The database contains state-level information on the use of nitrogen (N) and phosphorus (P2O5) fertilizer products as determined

by the U.S. Department of Agriculture (1966, 1976, 1977-1985) for fiscal years 1945 to 1985. This database also contains nitrogen and phosphorus fertilizer use data was compiled by the Statistical Reporting Service (SRS) of the USDA, based on information reported by state fertilizer control officials. State officials obtained monthly reports from fertilizer industry representatives (primarily fertilizer distributors) who in many states are legally required to report to regulatory agencies. Additional information on fertilizer use was obtained from voluntary surveys of more than 1,500 fertilizer manufacturers, blenders and sales outlets in the United States. In general, annual fertilizer use data reported by SRS reflects farm and non-farm uses of fertilizer. USDA phosphorus (P205) fertilizer data was multiplied by a factor of 0.437 to express phosphorus fertilizer use as P.

For certain years and states, information about fertilizer use is either incomplete or the product of fundamentally different estimation methods. For states with incomplete data, the SRS estimated current use from monthly data or from information about the previous year's fertilizer use.

Fertilized Acreage Data. The U. S. Department of Commerce (1974, 1978, 1982) reported fertilized acreage by county as part of the 1974, 1978, and 1982 Census of Agriculture. Farm operators with annual sales in excess of $1000 were requested to report the total acreage of cropland, pastureland, and rangeland treated with chemical fertilizers.

County Disaggregation of State-Level Fertilizer Use Data. To arrive at a county-level estimate from state-level data, the working assumption is that county-level fertilizer use is directly proportional to a county's fertilized acreage as represented in the following equation:

$$FCik = FSi\ FACik / FASi \quad (1)$$

where,

FCik is county-level fertilizer use for the ith state and kth county,
FSi is state-level fertilizer use for the ith state,
FACik is county fertilized acreage for the ith state and kth county, and
FASi is state fertilized acreage for the ith state.

Fertilizer use was disaggregated from the state-level to the county level based on the most contemporary estimate of fertilized acreage available for a given year. Although state-level information reported by USDA (1966, 1976, 1977-1985) generally included farm and non-farm uses, only farm uses were included. Calculations of fertilizer use will be underestimates in counties with large amounts of non-farm fertilizer use.

Data Reliability. County-level estimates of fertilizer use prior to the early 1970s should be used with caution. In addition, some states may contain counties with widely varying patterns of agricultural production. County variability in fertilizer application rates is expected to be smaller in states where fewer different types of crops are produced and where crop production is more uniformly distributed. The accuracy of prorating state-level fertilizer use could be improved in future studies with the use of an algorithm using fertilized acreage by crop type and typical application rate by crop type.

Fertilizer Sales (1986 to 1991).
A database on fertilizer sales was provided by the USGS Water Resources Division. The database includes information derived by the U.S. Environmental Protection Agency (1990) and by Jerald Fletcher (West Virginia University, written communication, 1992) about nitrogen fertilizer sales (tons) for fiscal years ending June 30. Nitrogen fertilizer sales by county were compiled from a combination of reports to state regulatory agencies and the 1987 Census of Agriculture. Fertilizer sales information submitted to state regulatory agencies by fertilizer dealers represents total sales irrespective of county or land use. Census of Agriculture statistics were used to account for non-responding farm operations (U.S. Department of Commerce, 1989b). In some counties, although no fertilizer sales were reported the Census did report fertilizer use. And though fertilizer expenditures ($1,000) represent the 1987 growing year, nitrogen fertilizer sales (tons) generally reflect 1991 amounts.

Fertilizer sales information was derived by the EPA and Fletcher using the following procedure:

(1) State fertilizer sales data were compiled from the National Fertilizer and Environmental Research Center of the TVA database,

(2) A ratio of county to state expenditures for commercial fertilizers was calculated from the 1987 Census of Agriculture (U.S. Department of Commerce, 1989a),

(3) County-level nitrogen fertilizer sales (tons) were derived by multiplying state sales by the ratio of county to state expenditures for commercial fertilizers.

Citations in Abstract Section:

U.S. Department of Commerce, 1989a, Census of Agriculture, 1987 - Final county file: U.S. Department of Commerce, Bureau of the Census, [machine-readable data file].

U.S. Department of Commerce, 1989b, Census of Agriculture, 1987 –Final county file technical documentation: U.S. Department of Commerce, Bureau of the Census, Data User Services Division.

U.S. Environmental Protection Agency, 1990. County-level fertilizer sales data: U.S. Environmental Protection Agency, Office of Policy, Planning, and Evaluation, PM-221.

Data Processing

County-level data were merged into a single dataset. These original county-level data included a few records with negative values for Nitrogen and Phosphorus estimates; these values were entered as zero before prorating the data to watersheds. To prorate a 1945 to 1991 county-level fertilizer use/sales database to NOAA's Coastal Assessment Framework (CAF), area-proration coefficients were calculated based on the percent of a county's land area enclosed by a 'unique' (USGS 8-digit Cataloging Unit and Estuarine Drainage Area intersection). Fertilized area was divided by the total area under agricultural land use, by county, for the years 1945 to 1985 and 1986 to 1991. All data processing was done using the SAS software.

Quality Control

County-level fertilizer use and fertilizer sales data were recomputed using a file with prorated values (fertilizer data by unique/county area) and compared with data in the original county database. The comparison provided equal values confirming the accuracy of the area proration.

Contact(s) on Data Processing

Percy A. Pacheco
Special Projects Office (SP), NOS/NOAA
1305 East West Highway, SSMC4, 9th Floor
Silver Spring, Maryland 20910
Tel: 301-713-3000
Fax: 301-713-4384
Email: mailto:percy.pacheco@noaa.gov

Citation:

Pesticides. Coastal Assessment and Data Synthesis (CA&DS) System, 1999. National Coastal Assessments (NCA) Branch, Special Projects Office (SP), National Ocean Service (NOS), National Oceanic and Atmospheric Administration (NOAA). Silver Spring, Maryland.

Applicable Digital Geography

The data are associated to distinct spatial aggregations. Geographic Information System (GIS) digital geographies are available for associating these data to their appropriate spatial aggregations. The following GIS files apply to and should be used with these data during GIS processing.

Coastal Watersheds
Hydrologic Cataloging Units
Counties
States

To download the data or an applicable digital geography, visit:
http://coastalgeospatial.nos.noaa.gov/data_gis.html.

For Additional Information:

For additional information, refer to NOAA's Coastal Assessment and Data Synthesis (CA&DS) System, or contact:

The CA&DS team.
Special Projects Office (SP), NOS/NOAA
1305 East West Highway, SSMC4, 9th Floor
Silver Spring, Maryland 20910
Tel: 301-713-3000
Fax: 301-713-4384